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Bezeichnung der Erfindung/Title of the invention/Titre de l'invention:
(Falls die Bezeichnung der Erfindung nicht angegeben ist, siehe Beschreibung.
If no title is shown please refer to the description.
Si aucun titre n'est indiqué se referer à la description.)

Visual watermark in both data area and inner-ring area of record carrier

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A word, for example, a trade name may be chosen as a visually detectable watermark. Such a watermark may be used, for example, to indicate the originality of the

record carrier. Moreover, a visually detectable watermark may also have a marketing function because the appearance of a record carrier is positively influenced, for example, by placing an image of the relevant artist in the watermark on a music CD. Moreover, recording of a word on the record carrier may render printing of the upper side of the record carrier superfluous. This reduces the production costs of the record carrier.

Although such a watermark can thus be used for checking the authenticity of a recording on the record carrier, it always remains possible that the algorithm for calculating the required predetermined run length distribution will be hacked. In that case, the presence of the correct watermark cannot be used anymore as authenticity prove.

In the record carrier according to the present invention this problem is overcome by expanding the picture and/or text that is embedded using this watermark technology into the surrounding text bands that are present in the inner-ring area and/or the outer-ring area of the record carrier. With the terms "inner-ring area" and "outer-ring" area the areas on the record carrier outside the area intended for data recording are intended.

In the mastering processes, these inner-ring and outer-ring areas are generally recorded during a separate phase during mastering. When these areas are recorded using the same encoder/references, the content of the areas can be synchronised with the image of the watermark in the data area.

However, in the method according to the invention, the content of these inner-ring and outer-ring areas are treated as if it was the same content to be embedded in the data area. This time however, the way in which the information are written in these areas is different from the way the watermark image is written to a simple laser-on / laser-off method like is currently used for text ring recordings.

To a skilled person, the process of disk mastering is well-known; therefore, no detailed description of this process is given; only the details relevant for the present invention are repeated below.

Before mastering the data area of a record carrier, the inner-ring area is written. This area is also called graphics band, text band, matrix band or identification band. For example, this graphics band can be defined as the area at a radius between 39 and 46 mm.

In order to write this text band, the Laser Beam Recording (LBR) is set at a different (higher) trackpitch than normally used when mastering the data area and is set in Constant Angular Velocity (CAV) mode. A pulse signal is provided for indicating the start of the writing of the text in the text band. A pulse signal is also given after the completion of each turn. This pulse signal is used for writing the watermark information turn after turn.

patterns),

embodiments described above, but can also be applied to all kind of record carriers, both read-only and recordable/rewritable.

It should further be noted that use of the verb "comprises/comprising" and its conjugations in this specification, including the claims, is understood to specify the presence of stated features, integers, steps or components, but does not exclude the presence or addition of one or more other features, integers, steps, components or groups thereof. It should also be noted that the indefinite article "a" or "an" preceding an element in a claim does not exclude the presence of a plurality of such elements. Moreover, any reference sign does not limit the scope of the claims; the invention can be implemented by means of both hardware and software, and several "means" may be represented by the same item of hardware. Furthermore, the invention resides in each and every novel feature or combination of features.

In summary, the invention relates to a record carrier comprising a data area comprising a pattern of substantially parallel tracks for storing data in the form of marks, in which the data is encoded by means of a channel code, wherein a parameter of the channel code is controlled so as to introduce a predetermined run length distribution in the marks on the record carrier, thereby introducing first information relating to a watermark, and a non-data area, e.g. graphics band, text band, matrix band or identification band, comprising second information relating to a watermark, the first and the second information forming the watermark. This watermark, extending over both the data-area and the inner-ring area and/or the outer-ring area, can be used for checking the authenticity of the record carrier and/or the recordings made on this record carrier. The invention also relates to a device for reading a record carrier, a method of providing a watermark on the record carrier, and a device for providing a watermark on a record carrier.

7. A record carrier as claimed in claim 1, wherein the parameter is the choice between channel words for information words from alternative tables, for example,

- storing the encoded data on the record carrier,
- storing the second information in the non-data area.

13. A device, e.g. a Laser Beam Recorder, for providing a watermark on a record carrier, the device comprising receiving means for receiving uncoded data, the receiving means being further adapted to receive first information relating to the watermark, which first information is to be provided in the encoded data, and to receive second information relating to the watermark, which second information is to be provided in a non-data area, the device further comprising encoding means for encoding the uncoded data to encoded data by means of a channel code, in which a parameter of the channel code is controlled under the influence of the first information relating to the watermark for introducing a predetermined run length distribution in the marks on the record carrier, the device further comprising means for storing the encoded data on the record carrier and for storing the second information in the non-data area.

ABSTRACT:

The invention relates to a record carrier comprising a data area comprising a pattern of substantially parallel tracks for storing data in the form of marks, in which the data is encoded by means of a channel code, wherein a parameter of the channel code is controlled so as to introduce a predetermined run length distribution in the marks on the record carrier, thereby introducing first information relating to a watermark, and a non-data area, e.g. graphics band, text band, matrix band or identification band, comprising second information relating to a watermark, the first and the second information forming the watermark. This watermark, extending over both the data-area and the inner-ring area and/or the outer-ring area, can be used for checking the authenticity of the record carrier and/or the recordings made on this record carrier.

The invention also relates to a device for reading a record carrier, a method of providing a watermark on the record carrier, and a device for providing a watermark on a record carrier.